

Thrush



HOT WATER
HEATING SYSTEM
FLOW CONTROL





FLOW CONTROL SYSTEM

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THE complete Thrush Flow Control System consists of a Thrush Water Circulator, a Thrush Flow Control Valve, a No. 201 Thrush Radiant Heat Control (thermostat), a No. 203 Thrush Modulating Boiler Control, a No. 198 Thrush Relay Transformer, a No. 12 Thrush Pressure Reducing Valve, a No. 4 Thrush Differential Pressure Relief Valve and a special air-tight Thrush Pressure Tank.

The system is a closed pressure system with automatic filling of the boiler, automatic relief of excess pressures, adequate provision for expansion when the water is heating and complete mechanical control of circulation.

When this system is used the heating plant becomes completely automatic, flexible and quick to respond to the slightest need for heat.

Thrush Flow Control System makes warm water heating "quick heating"—quicker than steam. A reservoir of warm water is kept available for instant distribution throughout the heating system. When heat is needed, forced circulation drives the warm water into every radiator in every room quickly. When room temperature is restored this circulation stops. Therefore there is no overheating and no waste of fuel. This warmer water in the boiler makes the auxiliary water heater efficient and provides a really hot domestic water supply in winter or summer at trifling cost.

Thrush Flow Control System is entirely automatic for summer-winter use. Nothing at all need be done to the job for summer operation. The patented Thrush Flow Control Valve shuts off all circulation through the building when heat is not needed but if heat is needed on an occasional chilly morning, Thrush System will provide it without a thought on the part of the tenant.

No matter what type of automatic firing device is used with a warm water job, Thrush Flow Control System will increase its efficiency and economy and give it a chance to really demonstrate its advantages.

Thrush Flow Control maintains absolutely uniform temperatures by Thrush Radiant Heat Control anticipating outside weather changes which was never before possible with any kind of heat. It reduces the running time of the firing device, saves 15 to 30 per cent of the yearly fuel bill and supplies hot domestic water service at nominal cost.

Thrush Flow Control can be installed quickly and economically on old or new heating plants.

A THRUSH SYSTEM FOR EVERY NEED

CLASS AA SYSTEM

consists of special Thrush Pressure Tank; No. 4— $\frac{3}{4}$ " Thrush Differential Pressure Relief Valve; No. 12— $\frac{3}{4}$ " Thrush Pressure Reducing Valve with Built-in Strainer; Combination Gauge and Thermometer; No. 5 Thrush Automatic Damper Regulator.

CLASS A SYSTEM

consists of special Thrush Pressure Tank; No. 4— $\frac{3}{4}$ " Thrush Differential Pressure Relief Valve; Combination Gauge and Thermometer; No. 5 Thrush Automatic Damper Regulator.

CLASS BB SYSTEM

consists of special Thrush Pressure Tank; No. 4— $\frac{3}{4}$ " Thrush Differential Pressure Relief Valve; No. 12— $\frac{3}{4}$ " Thrush Pressure Reducing Valve with Built-in Strainer; Combination Gauge and Thermometer;

CLASS B SYSTEM

consists of special Thrush Pressure Tank; No. 4— $\frac{3}{4}$ " Thrush Differential Pressure Relief Valve; Combination Gauge and Thermometer.

CLASS DD SYSTEM

consists of special Thrush Pressure Tank; No. 4— $\frac{3}{4}$ " Thrush Differential Pressure Relief Valve; No. 12— $\frac{3}{4}$ " Thrush Pressure Reducing Valve with Built-in Strainer.

CLASS D SYSTEM

consists of special Thrush Pressure Tank; No. 4— $\frac{3}{4}$ " Thrush Differential Pressure Relief Valve.

FEATURES OF THE THRUSH SYSTEM

● **Complete**—Thrush Flow Control System of Automatic Warm Water Heating is a complete, balanced, forced circulating pressure system with completely automatic flow control scientifically engineered—developed through years of practical experience and continuous use.

● **Forced**—Forced circulation puts warm water into every radiator—in every room, quickly. Circulation is stopped when room temperatures are recovered so that there is no overheating.

● **Automatic**—The operation of this system is fully automatic. It maintains uniform temperatures without thought of the home owner from the beginning of the year to the end.

● **Summer-Winter**—Thrush Flow Control is ideal for summer-winter hook-up because nothing whatever need be done to the system at any time. It will automatically provide heat in the home when heat is needed but in summer when heat is not desired in the radiators, none reaches them. Yet the automatic firing device continues to supply domestic hot water without interruption.

● **Economical**—Thrush Flow Control saves fuel by reducing the running time of the firing device

and eliminating the fuel and the cost of equipment otherwise required for domestic hot water.

● **Easy Installation**—Thrush Flow Control System is very easy and inexpensive to install. Refer to the diagrams—count the number, kind and cost of fittings—and you will be surprised at the extreme simplicity of Thrush.

● **Reduced Pipe Sizes**—Thrush Flow Control System permits the use of greatly reduced pipe sizes and requires smaller valves and fittings.

● **Less Labor**—The labor cost of installing a Thrush System is surprisingly low. There are no large pipes to cut and thread.

● **Zone Control**—Thrush Flow Control System is ideal where zone control is required. It is simply a matter of installing two or more Flow Control Valves, Circulators and Radiant Heat Controls.

● **Responsibility**—The Thrush company takes full responsibility for the satisfactory operation of a Thrush Flow Control System installed according to instructions—and its reputation and integrity makes that acceptance of responsibility valid.

A COMPLETE COORDINATED WARM WATER HEATING SYSTEM

1 Thrush Flow Control Valve (patented). Provides complete control of circulation.

2 Thrush Water Circulator. Assures positive, uniform forced circulation.

3 No. 4 Thrush Differential Pressure Relief Valve. Prevents excessive pressure in system.

4 No. 12 Pressure Reducing Valve. Reduces supply line pressure and provides automatic filling of the system.

5 Thrush Pressure Tank. Vents system of air and gases. Adds to safety.

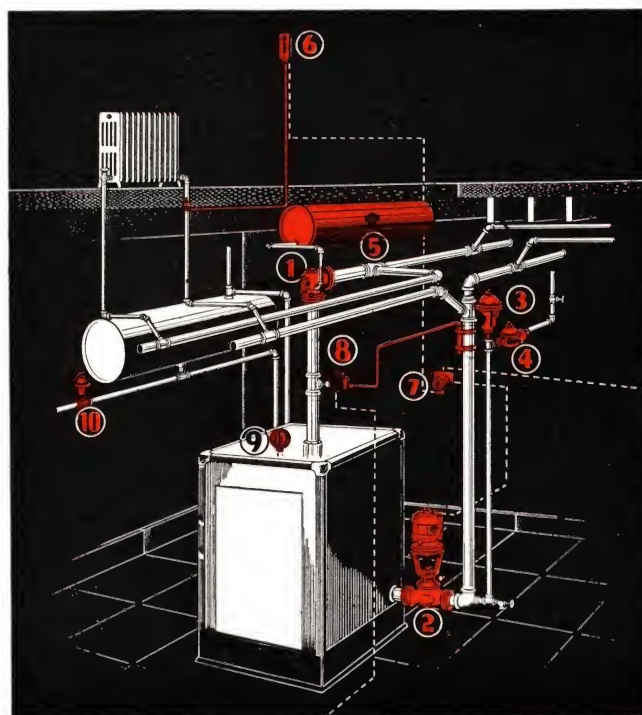
6 No. 201 Radiant Heat Control. Provides a constant supply of radiant heat and fractional degree control of room temperature.

7 No. 198 Relay Transformer. Used with No. 201 Radiant Heat Control to furnish line voltage to Circulator motor.

8 No. 203 Modulating Boiler Water Temperature Control. Operates firing device to vary boiler water temperature according to heating demand.

9 Special Combination Gauge and Thermometer. Gives accurate reading of pressure and temperature.

10 No. 75 High Pressure Relief Valve. Protects storage tank and plumbing fixtures from excessive pressure.



ENGINEERING AND FIGURING RADIATION

The following BTU method for figuring radiation is simple enough to be of practical value. Through the use of this method you will be assured that ample radiation is being provided. The tables give basic factors which can be used

to accurately determine the amount of radiation or heat required to maintain any desired room temperature under practically all conditions. These tables are followed by an example which gives explanation for their use.

Tables of BASIC HEAT LOSS CO-EFFICIENTS

Masonry Walls					
Masonry Thickness (inches)	Type of Wall	Interior Finish			
		Plain	Plastered		
			No Finish	1/2 in. Thick	On Lath— furred
8	Solid Brick	.50	.46	.32	.22
12		.36	.34	.25	.19
16		.28	.27	.21	.16
8	Hollow Tile Stucco	.40	.37	.27	.20
10		.39	.37	.27	.19
12		.30	.29	.22	.17
8	Limestone or Sandstone	.71	.64	.39	.25
12		.58	.53	.34	.23
16		.49	.45	.31	.22
10	Concrete	.62	.57	.37	.24
16		.48	.44	.31	.21
20		.41	.39	.28	.20
8	Cinder Block	.42	.39	.28	.20
12		.37	.35	.26	.19
8	Concrete Block	.56	.52	.34	.23
12		.49	.46	.32	.22

Masonry Walls With Veneer					
Type of Wall		Interior Finish			
Facing	Backing inches	Plain	Plaster		
			No Finish	1/2 in. Thick	On Lath— furred
			No Finish	1/2 in. Thick	On Lath— furred
4 in. Brick or Cut-Stone Veneer	Hollow Tile	6	.37	.35	.26
		8	.36	.34	.25
		10	.35	.33	.25
		12	.28	.26	.21
		16	.41	.38	.28
		20	.41	.38	.28
	Concrete	6	.61	.56	.36
		8	.51	.47	.32
		10	.47	.43	.29
		12	.31	.30	.23
		16	.44	.42	.30
		20	.40	.38	.28

Plastered Frame Walls with Various Exteriors					
Type of Wall		Interior Finish			
Exterior Finish	Sheathing Inches	Lath	Interior Finish		
			Studs and 1/2 in. rigid insul.	Studs and 1 in. rigid insul.	Studs and Lath with insul. fill
Wood Siding or Shingles	Wood Plaster Bd.	1/2	.30	.22	.17
		1	.35	.25	.19
Stucco	Wood Plaster Bd.	1/2	.35	.25	.18
		1	.47	.29	.21
Brick Veneer	Wood Plaster Bd.	1/2	.32	.23	.17
		1	.42	.27	.20

Partitions			
Construction		Plain	Finished one side
Studs, lath and plaster.....		.62	.34
4 in. Clay Tile.....		.45	.42
4 in. Gypsum Tile.....		.30	.28
4 in. Clay Brick.....		.50	.46

Concrete Floors and Ceilings					
Type of Ceiling	Inches Thick	Type of Finish Flooring			
		Bare	Wood on Sleepers		Tile or Terrazzo
			Single	Double	
No Ceiling	4	.65	.40	.31	.61
	6	.59	.37	.30	.56
	8	.53	.35	.28	.51
Plaster direct to Concrete	4	.59	.38	.30	.56
	6	.54	.35	.28	.52
	8	.50	.33	.27	.47
Suspended Lath (or Plaster Bd.) & Plaster	4	.37	.28	.23	.36
	6	.35	.26	.22	.34
	8	.33	.25	.21	.32
Suspended 1/2 in. Rigid Insulation & Plaster	4	.24	.20	.17	.24
	6	.23	.19	.17	.23
	8	.22	.18	.16	.22
1 1/2 in. Corkboard & Plaster	4	.15	.13	.12	.14
	6	.14	.13	.12	.14
	8	.14	.12	.11	.14
No Ceiling Floor on Ground	4	1.07	.35	.28	.98
	6	.90	.33	.27	.84
	8	.79	.32	.26	.74

Plastered Ceilings with Unheated Attic and Shingles (or Composition Roofing) on Wood Sheathing Above									
Insulation Between Ceiling Joists	No Attic Flooring				1 in. Pine Attic Flooring				
	On Lath (or Plaster Board)	On 1/2 in. Rigid Insul.	On 1 in. Rigid Insul.	On 2 in. Cork- board	On Lath (or Plaster Board)	On 1/2 in. Rigid Insul.	On 1 in. Rigid Insul.	On 1 1/2 in. Corkboard	On 2 in. Cork- board
None.....	.30	.22	.16	.12	.21	.16	.12	.10	.09
1/2 in. Flexible.....	.16	.13	.11	.10	.13	.11	.10	.08	.07
2 in. Fill.....	.15	.11	.08	.07	.12	.09	.07	.06	.05
4 in. Fill.....	.11	.08	.06	.05	.09	.06	.05	.04	.03

Frame Floors and Ceilings				
Type of Ceiling	Type of Flooring			
	None	Pine	Pine on 1/2 in. Rigid Insul.	Maple or Oak on Pine
No Ceiling.....	.55	.32	.40	.40
Lath and Plaster or Plaster Bd.....	.73	.33	.24	.28
Lath, Plaster and 4 in. Rock Wool.....	.11	.10	.09	.09
1 1/2 in. Corkboard and Plaster.....	.19	.14	.13	.13

Flat Roofs											
Type of Roof Deck	No Ceiling						Lath (or Plaster Board) and Plaster Ceiling				
	Rigid Type Insulation						Rigid Type Insulation				
	No Insul.	1/2 in. Fibre	1 in. Fibre	1 in. Cork	1 1/2 in. Cork	2 in. Cork	No Insul.	1/2 in. Fibre	1 in. Fibre	1 in. Cork	1 1/2 in. Cork
Concrete 2 in.....	.82	.37	.24	.22	.16	.13	.42	.26	.19	.18	.14
Concrete 4 in.....	.72	.34	.23	.21	.16	.12	.40	.25	.18	.17	.13
Concrete 6 in.....	.64	.33	.22	.21	.15	.12	.37	.24	.18	.17	.13
Wood 1 in.....	.49	.28	.20	.19	.14	.12	.32	.21	.16	.15	.12
Wood 1 1/2 in.....	.37	.24	.18	.17	.13	.11	.26	.19	.15	.14	.11
Wood 2 in.....	.32	.22	.16	.16	.12	.10	.24	.17	.14	.13	.11
Flat Metal.....	.95	.39	.25	.23	.17	.13	.46	.27	.19	.18	.14
Bare Cor. Iron.....	1.50						1.10				

Windows, Skylights and Doors			Air Changes in Room					
Single Windows or Skylights	Double Windows or Skylights	Doors	Changes per hour					
			1/2	1	1 1/2	2	3	4
1.35	60	.69	.009	.018	.027	.036	.054	.072

AIR CHANGES TO BE USED UNDER NORMAL CONDITIONS

Type of Room or Building	Air Changes per Hour
Rooms having walls protected from outdoor air (basement rooms, etc.)	1/2
Rooms having 1 side exposed	1
Rooms having 2 sides exposed	1 1/2
Rooms having 3 or 4 sides exposed, bathrooms, public rooms (stores, churches, etc.) and residence entrance halls	2
Entrance halls or lobbies to public buildings	3 or 4

Add 1/2 air change to rooms on side or corner of prevailing wind and also those with fireplace.

INSTALLATION DATA

OUTDOOR DESIGN TEMPERATURE

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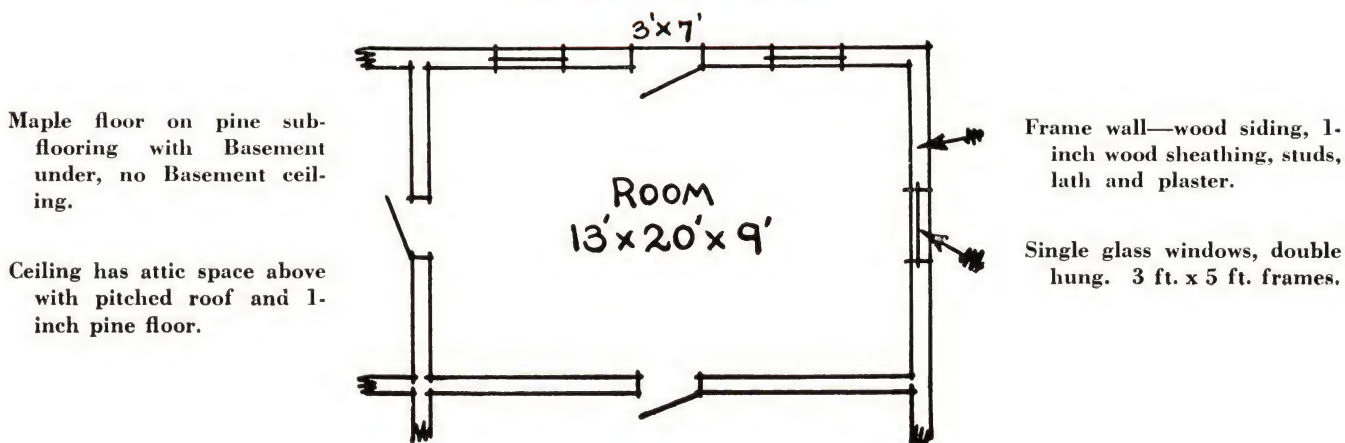
In selecting an outdoor temperature to arrive at the required temperature difference it is not necessary to use the lowest outdoor temperature nor should the average winter temperature be

used. A temperature of at least 40° below the average winter temperature in or near your locality, taken from the Weather Bureau Records, is recommended.

RADIATOR HEAT EMISSIONS

Average Water Temp. in Radiators	Approximate Emission per Hour per Sq. Ft. of Direct Radiation
180° F.	170 B.t.u. (recommended for regular Thrush gravity systems).
190° F.	180 B.t.u.
200° F.	200 B.t.u. (recommended maximum for Thrush Flow Control Systems).

EXAMPLE



FIRST

Determine B.t.u. or heat loss through all exposed or cold surfaces.

EXPOSED WALL: There is a net surface of 231 sq. ft. and the basic heat loss factor for this construction will be found in the table to be .30 B.t.u. The room temperature to be maintained in this example is 70° F. and the outdoor temperature zero, giving a temperature difference of 70°. Therefore $70^\circ \times .30 \text{ B.t.u. per sq. ft.} = 21 \text{ B.t.u.}$; $21 \text{ B.t.u.} \times 231 \text{ sq. ft.} = 4851 \text{ B.t.u. loss per hour through exposed wall.}$

In like manner the loss through **WINDOWS,**

CEILING AND OUTSIDE DOOR can be found. These losses will be found to be 4252 B.t.u., 3822 B.t.u. and 1014 B.t.u., respectively.

FLOOR LOSS: The basement under this floor is closed to the outside air and is partially heated by the mains so therefore assume its temperature to be 50° in zero weather, making a temperature difference of 20° between the two sides of floor. The basic heat loss factor for each degree of difference is .40 B.t.u. Therefore $20^\circ \times .40 \text{ B.t.u.} = 8 \text{ B.t.u.}$; $8 \text{ B.t.u.} \times 260 \text{ sq. ft.} = 2080 \text{ B.t.u. required for floor.}$

SECOND

Determine B.t.u. required to heat air entering room by infiltration which results from chimney drafts, opening of doors, leakage through cracks, etc.

Cubical contents are 2340 cu. ft. and since the air in this room will change approximately $1\frac{1}{2}$

times each hour select the basic factor from the table which is .027 B.t.u. $70^\circ \times .027 \text{ B.t.u.} = 1.89 \text{ B.t.u.}$; $1.89 \text{ B.t.u.} \times 2340 \text{ cu. ft.} = 4423 \text{ B.t.u. required for air entering room by infiltration.}$

THIRD

Determine the direct cast iron or equivalent radiation requirement for this room.

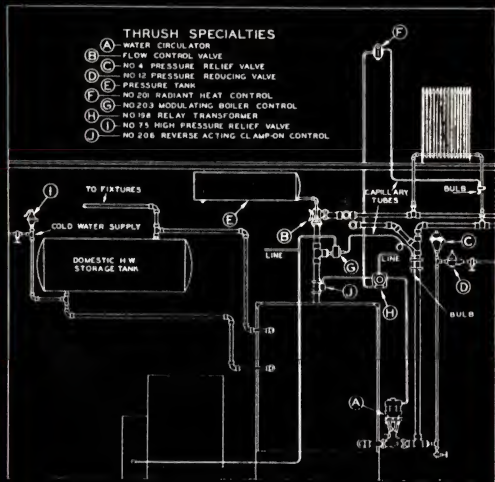
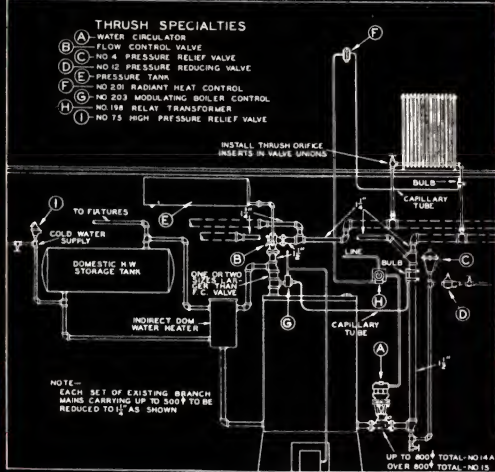
Take the total B.t.u. requirement found in the first and second steps of this example, which is 20,442 B.t.u. and divide same by any desired heat emission for each sq. ft. of radiating surface which will be found above this example. For regular Thrush Systems in which gravity or

natural circulation is to be used, we would recommend a heat emission of 170 B.t.u. per sq. ft. $20,442 \div 170 = 120 \text{ sq. ft. of radiation,}$ or its equivalent required to heat this room. We would recommend a maximum heat emission of 200 B.t.u. for Thrush Flow Control Systems which would make this room require 102 sq. ft.

TYPICAL INSTALLATIONS

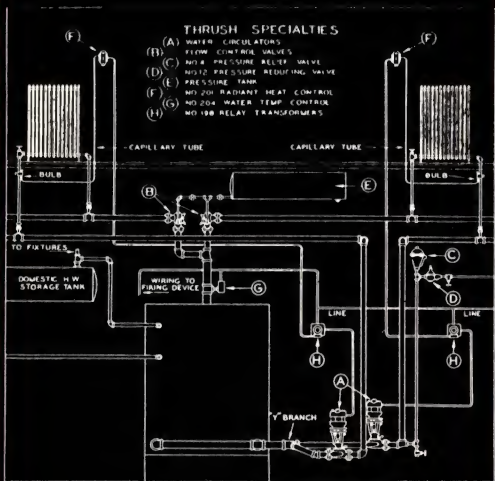
CONVERSION INSTALLATION HAVING TWO FLOW AND RETURN MAINS

Average installation showing conventional method of main reduction in accordance with pipe size tables given on page 10. This can usually be accomplished with nipples and fittings, and minimum of pipe work and labor. In addition to main reductions, Thrush Orifice Inserts should be installed in radiator valves over $\frac{1}{2}$ " in size, to balance flow through large branch connections.



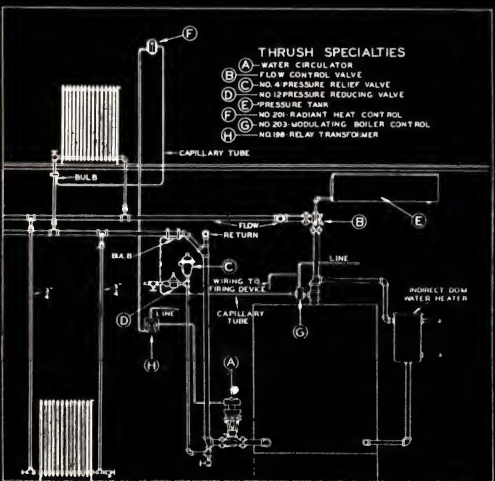
STOKER FIRED INSTALLATION

Shows proper installation of Thrush Flow Control System with soft coal stoker fired boiler. Stoker is controlled by No. 203 Thrush Modulating Boiler Control G. The No. 206 Control J is wired to Thrush Circulator and will start Circulator if boiler temperature should over-ride to 220 degrees. Will operate Circulator just long enough to reduce boiler temperature. If stoker does not have some form of draft control to reduce natural draft, then it is advisable to place a swing check damper in draft chamber ahead of blower. This will prevent high boiler temperatures between stoker operations. The No. 201 Thrush Radiant Heat Control F operates Thrush Circulator only to maintain constant room temperature.



ZONE CONTROL INSTALLATION

Shows proper application of Thrush Flow Control equipment for two zone installation. A Thrush Flow Control Valve and Circulator, with separate No. 201 Thrush Radiant Heat Control, makes each zone a separate heating plant. Insures perfect temperature control to meet individual demand of each unit. Any desired temperature can be maintained in each zone, making it unnecessary to overheat one portion of a building in order to properly heat another part. Any number of zones can be heated from one boiler, eliminating the additional boilers that would be required to furnish individual heating for two or more tenants. Particularly recommended for apartments, row houses, or store buildings having several tenants.



TYPICAL INSTALLATION WITH CONNECTIONS FOR BASEMENT RADIATOR

Shows method of circulating basement radiation with flow and return branches dropping down from mains on basement ceiling. Saves running separate return around wall at floor level. In buildings having no basement all of the radiators can be on the same level of the boiler and the flow and return mains carried above the radiators as shown. Domestic water connections are also shown.

TYPICAL INSTALLATIONS

TYPICAL INSTALLATION FOR BUILDINGS WITHOUT BASEMENT

In localities where conditions prohibit excavating for basements, this detail shows how Thrush Flow Control System can be adapted. The boiler can be on the first floor level, or slightly lower, and both the flow and return mains carried under the first floor. Sizing of mains and branches is the same as used for conventional up-feed system.

ARCOLA TYPE INSTALLATION—OVERHEAD FEED

Shows correct installation of complete Thrush Flow Control System for Arcola type systems where flow main is carried overhead and return under floor.

Provides summer-winter domestic water supply and all the advantages of larger Flow Control installations.

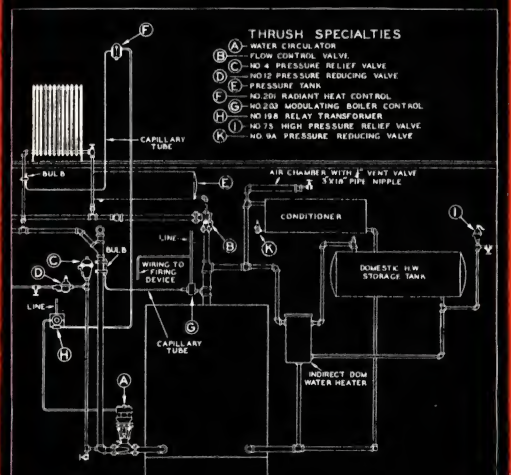
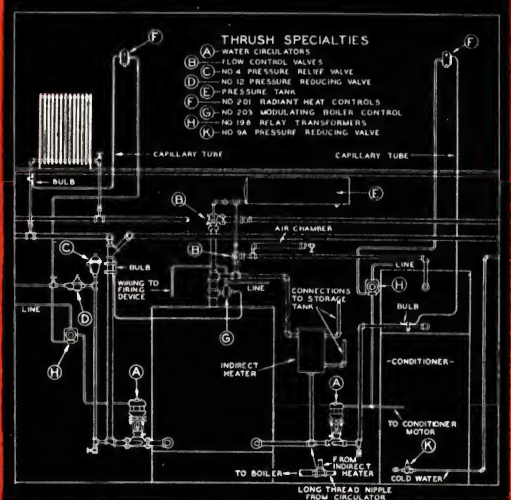
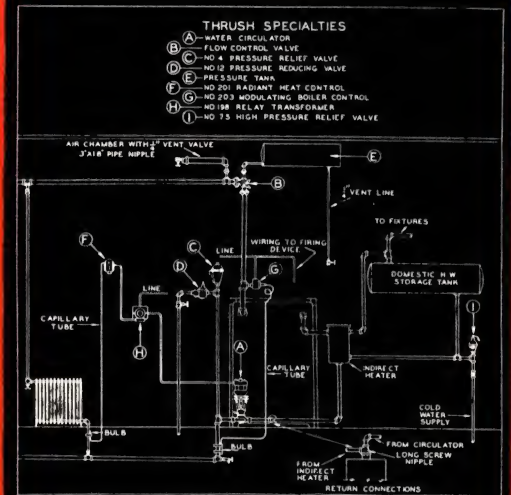
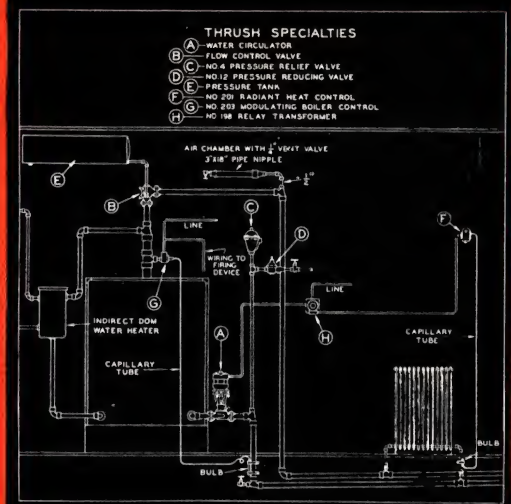
Thrush Pressure Tank provides for expansion of boiler water. Air chamber is required to vent the flow main.

THRUSH FLOW CONTROL SYSTEM WITH SUMMER-WINTER CONDITIONER (SPLIT SYSTEM)

Where it is desired to heat as well as condition some rooms with the conditioner, this detail shows proper application of Thrush Flow Control System. It is not desirable to recirculate air from certain rooms (such as garages, servants' quarters, kitchens and baths). This installation provides zone control of the radiator system with the conditioner on a separate zone. Year around domestic water supply is an important feature of this system as shown. Thrush engineers recommend warm water heating for the entire building with air conditioning for part of the building, if desired.

THRUSH FLOW CONTROL SYSTEM WITH WINTER CONDITIONER

This detail shows the complete Thrush Flow Control System in conjunction with a winter conditioner for cleaning and humidifying the air in living and sleeping rooms. The entire heating system is by warm water radiators sensitively controlled by the No. 201 Thrush Radiant Heat Control. Year around domestic water supply is also an additional advantage for this type of heating and conditioning system.



For THRUSH FLOW CONTROL SYSTEM

Radiator Valve and Riser Sizes to All Floors

	Steel Pipe
0—100 sq. ft. radiation.....	1/2"
over 100 sq. ft. radiation.....	3/4"
	Copper Pipe
0—60 sq. ft. radiation.....	*3/8"
60—125 sq. ft. radiation.....	1/2"
over 125 sq. ft. radiation.....	3/4"

*Where 3/8" lateral branches are over average length, increase to 1/2" between mains and vertical risers.

Risers to Two or More Radiators to Upper Floors

	Steel Pipe	Copper Pipe
0—75 sq. ft. total radiation	1/2"	1/2"
75—110 sq. ft. total radiation	3/4"	1/2"
over 110 sq. ft. total radiation	3/4"	3/4"

Main Sizes

Sq. Ft. of Radiation	Size and Number of Mains
0- 300	one 1"
301- 500	one 1 1/4" or two 1"
501-1000	one 1 1/2" or two 1 1/4"
1001-1500	one 2" or two 1 1/2"
1501-2500	one 2 1/2" or two 2"
2501-5000	one 3" or two 2 1/2"

2 1/2" and 3" mains may be reduced to 2" at proper radiation intervals.

COPPER PIPE

Sq. Ft. of Radiation	Size and Number of Mains
0- 300	one 3/4", over 50' long, 1"
301- 500	one 1" or two 3/4"
501- 800	one 1 1/4" or two 1"
801-1250	one 1 1/2" or two 1 1/4"
1251-2000	one 2" or two 1 1/2"
2001-3500	one 2 1/2" or two 2"
3501-7000	one 3" or two 2 1/2"

2", 2 1/2", and 3" mains may be reduced at proper radiation intervals to 1 1/2".

Mains of unusual length or those meeting a special condition should receive special consideration.

B. T. U. Heat Emission Factors

Per Square Foot per Hour for Various Average Water Radiator Temperatures

170 B.T.U.	for 180° F. average
180 B.T.U.	for 190° F. average
200 B.T.U.	for 200° F. average

It is reconciled as satisfactory in consideration of practical operation a maximum B.T.U. emission factor of 200 for calculations in Thrush Flow Control Systems.

For Thrush Flow Control System Conversion Jobs

Reduce flow and return mains at the boiler to same sizes as shown in tables, using reducing elbows or couplings and connect reduced return mains with Y fittings. Old jobs having 3/4", 1", 1 1/4" or 1 1/2" radiator valves should be reduced to proper sizes with Thrush Orifice Inserts.

Carry all flow or return mains full size to terminating radiators or to end of main. Mains should terminate in first floor radiators where possible. Mains should pitch up from boiler to terminating radiator in the average up-feed installation.

Net boiler sizes should be determined from the total B.T.U. requirement, divided by 150, which is conventional method of boiler ratings. Boiler should be chosen on this basis of rating for standing radiation equivalent.

Flow Control Valve Sizes

	Steel Pipe Sq. Ft. Rad.	Copper Pipe Sq. Ft. Rad.
No. 114—1"	Up to 300	Up to 500
No. 114A—1 1/4"	Up to 500	Up to 750
No. 115—1 1/2"	Up to 1,000	Up to 1,250
No. 120—2"	Up to 1,500	Up to 2,000
No. 125—2 1/2"	Up to 2,500	Up to 3,500
No. 130—3"	Up to 5,000	Up to 7,000

Circulator Sizes for Flow Control System

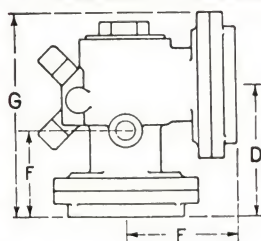
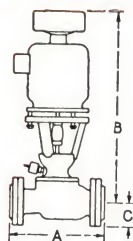
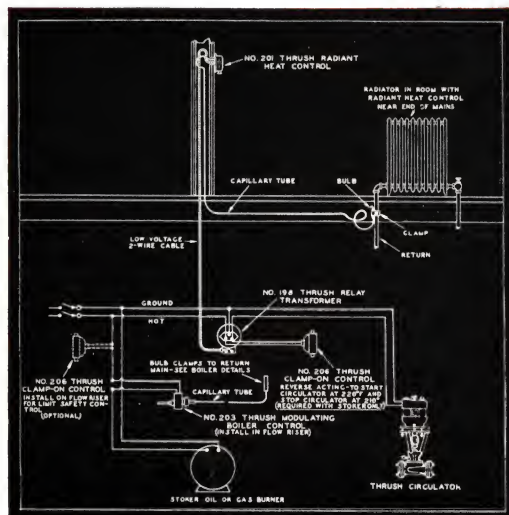
No. 14—1"	Up to 500 sq. ft. radiation
No. 14A—1 1/4"	Up to 800 sq. ft. radiation
No. 15—1 1/2"	Up to 1,500 sq. ft. radiation
No. 22—2"	Up to 2,500 sq. ft. radiation
No. 23—3"	Up to 5,000 sq. ft. radiation

*Tank Sizes for Flow Control System

No. 0.	Up to 500 sq. ft. radiation.
No. 1.	Up to 1000 sq. ft. radiation.
No. 2.	Up to 2000 sq. ft. radiation.
No. 3.	Up to 3000 sq. ft. radiation.

*Above sizes for 1 or 2 story buildings. Use one size larger tank for 3 or 4 story buildings.

WIRING DIAGRAM AND ROUGHING-IN DIMENSIONS



Circulator		A	B	C
No.	Size, in.	In.	In.	In.
14	1	8 3/4	16 3/4	1 1/8
14A	1 1/4	10 1/8	16 3/4	2 1/8
15	1 1/2	10 1/8	17	2 1/8
22	2	10 1/8	20 3/4	2 3/8
23	3	11 3/8	21	3 3/8

Flow Control Valve		D	E	F	G
No.	Size, in.	In.	In.	In.	Overall, in.
114	1	2 3/16	2	1	4 1/16
114A	1 1/4	4 1/8	3 3/4	2 3/4	6 3/8
115	1 1/2	4 5/8	4 1/8	3 1/8	6 7/8
120	2	4 3/4	4 1/16	3	7 3/8
125	2 1/2	5 1/4	4 3/8	3 1/4	8 1/4
130	3	6 1/2	5 7/8	3 3/8	9 3/4

HOT WATER SPECIALTIES

THRUSH LOW PRESSURE

Relief Valves

Thrush Relief Valves for hot water heating plants are made in a range of types, sizes, and prices, to meet varying conditions. All have all-brass working parts and can be supplied from the factory set for any relief pressure up to 35 lbs. The standard pressure relief setting is 28 lbs.

No.	Size	Made of	Weight
4	3/4"	Iron	12 lbs.
30	1 1/2"	Iron	4 lbs.
35	1 1/2"	Brass	3 lbs.
40	1 1/2"	Iron	3 lbs.

Reducing Valves

Pressure regulating valves to maintain predetermined pressure automatically. All working parts are brass. Bronze metal diaphragm operated. Standard factory pressure setting for delivery pressure of 12 lbs., with an initial pressure of 45 lbs. Specify when ordering if different pressure setting desired.

No.	Size	Made of	Weight
9	1/4"	Brass	2 lbs.
9A	3/8"	Brass	2 lbs.
10	1/2"	Brass	4 lbs.
11	1/2"	Brass	5 lbs.
12	3/4"	Iron	7 lbs.

THRUSH HIGH PRESSURE

Relief Valves

All are metal diaphragm operated Relief Valves with all-brass working parts, soundly designed to protect safely hot water supply boilers, range boilers, and gas storage heaters. Can be supplied from factory set at any pressure up to 150 lbs. Standard setting 85 lbs. Specify when ordering if other than 85 lbs. pressure setting required.



Illustrates appearance of Nos. 75, 77, 86 and 88 Relief Valves.

No.	Size	Made of	Weight
45	1/2"	Iron	3 lbs.
75	1/2"	Iron	3 lbs.
77	1/2"	Brass	3 lbs.
55	3/4"	Iron	4 lbs.
85	3/4"	Iron	4 lbs.
86	3/4"	Iron	4 lbs.
88	3/4"	Brass	4 lbs.

Reducing Valves

Plumbing fixtures are automatically guarded against excessive water supply line pressures by these time-tested, metal diaphragm operated Reducing Valves that have all-brass working parts. Standard factory pressure setting for delivery pressure of 45 lbs., with initial pressure of 150 lbs. If different setting desired, specify both initial and delivery pressures when ordering.

No.	Size	Made of	Weight
20	1/2"	Brass	4 lbs.
50	3/4"	Iron	7 lbs.
60	3/4"	Brass	6 lbs.
70	1"	Brass	11 lbs.

Thrush Relief Valves are tested, approved and listed as standard by the Underwriters' Laboratories and comply with A.S.M.E. boiler code requirements.

COMBINATION HIGH PRESSURE AND TEMPERATURE RELIEF VALVES

No.	Size	Made of	Weight
76	1/2"	Iron	3 lbs.
78	1/2"	Brass	3 lbs.
87	3/4"	Iron	4 lbs.
89	3/4"	Brass	4 lbs.

Similar in construction and for same purposes as high pressure relief valves, but with additional feature—temperature relief. A fusible plug melts from excessive temperature. Can be furnished from factory set at any pressure up to 150 lbs. Standard setting, 85 lbs. Specify when ordering if other than 85 lb. setting required.

THRUSH DUAL CONTROL UNITS

The Thrush Dual Control Units are made in three types. Standard and Master are constructed of brass, and No. 67 has brass working parts with cast iron housing.

These Units fill the system automatically with the proper amount of water, also automatically relieve excessive pressure. All are equipped with built-in strainer and are guaranteed against defects in workmanship and material.

The Master Unit is bigger and has larger waterways for quicker filling.

For more efficient operation install a Thrush Basement Pressure Tank in conjunction with a Thrush Dual Unit.

"Standard"

"Master"

No. 67



No. 30



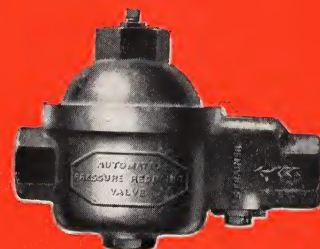
No. 10



No. 11



No. 45



No. 50



No. 20



H. A. THRUSH & CO.
PERU, INDIANA

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